



Termites as an (often neglected) outgroup in ecological immunology studies

Author(s): Rebeca B. Rosengaus, Erin L. Cole

Institution(s): Department of Marine and Environmental Sciences, Northeastern University, Boston, USA ; Department of Marine and Environmental Sciences, Northeastern University, Boston, USA

Since the publication of Schmid-Hempel's *Parasites in Social Insects* back in 1998, there has been a steady yearly increase in the number of scientific publications focusing on the dynamics between parasites/pathogens and their social hosts. Termites represent the oldest eusocial insect taxon, diverging from a common roach-like ancestor ~170 -150 million years ago. The wood-dwelling prototermite lived as family units and likely experienced significant pathogenic selection pressures prior to the inception of eusociality. Because termites have unique life-history traits among the social insects, they are excellent candidates for ecological immunology studies. In contrast with the social Hymenoptera, the distinctive traits of termites include diploidy, a monogamous mating system with biparental care, holometabolous development, unbiased sex ratios, symbiont-dependent nutrition, and a cellulose (low nitrogen)-based diet. Moreover, their mutualistic gut symbionts likely play a role against pathogenic threats, both at the individual and colony levels. All of these unique traits may influence the dynamics between termite hosts and their pathogens. Therefore, termites should be a particularly informative social insect outgroup when framing questions about the influence of pathogens on parental investment and resource allocation as well as parental effects (transgenerational immune-priming) and trade-offs between immune function and other fitness-related parameters.